# The Bank's new UK commodity price index

## By Andrew Logan and Lucy O'Carroll.(1)

As a consequence of their method of calculation, existing commodity price indices do not provide an accurate summary measure of commodity price pressures in the UK economy. The Bank has therefore constructed a new commodity price index, which it uses in its analysis of inflationary pressures in the Inflation Report. This article outlines how it is constructed, compares its recent trends with those of other major indices, and assesses how informative the Bank index is about price movements further along the supply chain.

## Introduction

Indices which weight together movements in the prices of 'basic' commodities are often used in analysing inflationary pressures. One reason for this is that, since basic commodities are usually purchased for further processing, changes in their prices will affect producers' costs, and these changes may eventually be passed on to consumers. Some commodities are also purchased by consumers in their unprocessed state (fresh foodstuffs, for example); price changes in these goods affect retail prices directly. In addition, to the extent that commodity prices are determined in auction markets that respond immediately to factors affecting demand and supply, they may be more flexible and adjust more quickly to news than, for example, the general price level or wages. If so, commodity price indices may also give early warning of turning-points in the economic cycle.

In the past, analysts have had a variety of such indices from which to choose, differing in the nature and geographical coverage of the price pressures being measured. In general, however, these indices have not reflected UK commodity price pressures—for three main reasons.

First, the weights they give to the various commodities do not reflect their relative importance for the UK economy, since they are normally not based on domestic demand (indigenous production minus net exports). Second, some of them use prices obtained by translating *world* market prices into sterling equivalents. This method is inappropriate for the prices of agricultural commodities grown within the European Union, since these are generally covered by the Common Agricultural Policy (CAP).<sup>(2)</sup> Finally, the indices generally do not cover fuels comprehensively.

The Bank has constructed a new index to address these three issues. The index is based on UK demand for basic

commodities—both directly by consumers and indirectly through the production process. Its construction does, however, raise a number of technical issues; it is easier to point to problems with indices than to correct them. In particular, since the Bank's index excludes, as far as possible, semi-manufactured and processed goods, it may underestimate the importance to the UK economy of unprocessed commodities—such as timber or natural rubber—which are used in production but are not imported in large amounts in their raw state. Furthermore, because of the importance of labour costs and other components of value added, the new index's links to the general level of prices in the economy may be quite weak.

What the new index does provide, however, is information on movements in the prices of basic, unprocessed goods which affect the general price level in the United Kingdom; and it does this more accurately than many alternative indices. Movements in the components of the index (metals, fuels, non-food agriculture, non-indigenous foodstuffs and indigenous agricultural commodities) may also be of interest where they can be used to identify possible sources of sectoral price pressures: strong movements in agricultural prices, for example, will have a particular impact on food manufacturing industries. This information can help in the understanding and interpretation of inflationary pressures in the economy and is used, for example, in the analysis of price dynamics in the Bank's *Inflation Report*.

## **Constructing the index**

## Weights and prices

The Bank's new index weights commodities by estimates of the value of demand in 1990. Ideally, this weighting should be done using consistent data on domestic production, imports and exports; net exports could then be subtracted from production to give figures for the use of the various

<sup>(1)</sup> The authors work, respectively, in the Bank's Conjunctural Assessment and Projections Division and Structural Economic Analysis Division. They would like to thank all those who attended the commodities workshop held at the Bank in March 1995 for their helpful insights; but any errors

remain the authors' responsibility.

(2) The Hongkong and Shanghai Banking Corporation (HSBC) index does use European prices—which are influenced by the CAP—for wheat, maize, beef and pork.

commodities. Unfortunately, in practice it is not possible to follow this method throughout, and the Bank index uses the best available weighting option for each commodity group. Where possible, data for production, imports and exports of an individual commodity have been taken from the same source. Where a number of data sources are available for a commodity, their merits have been compared. Price series have been chosen on the basis of their representativeness and timeliness. And a number of specialist organisations have given advice on both weights and prices.

The main elements of this *ad hoc* process are:

- Metals: Data collected as part of the new European standard business inquiry (Prodcom) are used to provide consistent figures for UK use.(1) Weights have been rescaled from 1993 to 1990. Spot prices from the London Metals Exchange (LME) are used for the price series.
- Fuels: Domestic production and net export values are obtained directly from the 1991 Digest of UK Energy Statistics. Prices are based on the price for one month forward Brent crude (which is far more heavily traded than the spot contract) for oil, the Central Statistical Office's (CSO's) coal mining output price and the retail prices index (RPI) natural gas price, excluding VAT effects.(2)
- Non-food agriculture: Prodcom data provide consistent figures for UK demand for timber and cork, rescaled to 1990. The index assumes that there is no domestic production of cotton, natural rubber or tobacco, and uses net import values [based on three-digit Standard Industrial Trade Classification (SITC) codes, which provide the most comprehensive definition of each of the basic commodities].(3) Timber and cork prices are based on the CSO's producer input import price, the natural rubber price is taken from an average physical auction price for deliveries in the United Kingdom, the tobacco price is taken from International Financial Statistics (IFS), and the cotton price is based on an average of price quotations, published in Cotton Outlook.
- Non-indigenous foods: It is assumed that there is no indigenous production of cocoa, coffee, tea, rice, bananas and edible oils.(4) Net import values are based on three-digit SITC codes for all non-indigenous foods except edible oils—where Prodcom estimates are used and rescaled to 1990—and bananas, where four-digit (more disaggregated) SITC codes are used. Cocoa prices are obtained from the London Commodities Exchange, and coffee, rice, banana and tea prices from IFS; the prices of edible oils are based on producer input import prices.

• *Indigenous agriculture*: The weighting is based on the value of total UK agricultural production; this includes, among other items, cereals, milk, livestock and wool clip. The price series is taken from the monthly agricultural price index published by the Ministry of Agriculture, Fisheries and Food (MAFF).<sup>(5)</sup> This series is based on the prices received by farmers for their output, and so reflects the impact of the CAP.

### Comparing the Bank index with other indices

The resulting weights—for both the oil-inclusive and non-oil versions of the index—are shown as percentage shares in Table A. Table B gives a comparison with the weights used

Table A Weights for the Bank's commodity price index(a)

Percentages

	Including oil	Excluding oil
Metals Aluminium Copper Lead Nickel Tin Zinc	5.6 2.3 1.8 0.6 0.2 0.1 0.6	7.1 2.9 2.3 0.8 0.2 0.2
Fuels Crude oil Natural gas Coal	<b>51.6</b> 21.0 18.5 12.1	38.8 23.5 15.3
Non-food agriculture Timber and cork Tobacco Natural rubber Cotton	5.5 4.6 0.6 0.2 0.1	<b>6.9</b> 5.8 0.8 0.2 0.2
Non-indigenous food Bananas Cocoa Coffee Rice Tea Edible oils	2.2 0.5 0.4 0.4 0.3 0.2 0.3	2.8 0.7 0.5 0.6 0.4 0.2 0.4
Indigenous agriculture	35.0	44.4
Total  (a) Based on 1990 values.	100.0	100.0

in a number of other indices. It should be noted, however, that the different indices sometimes include different commodities within the broad categories in Table B, as a result of choices made in constructing them.

As Table B illustrates, the Bank's new index differs significantly from other indices. Metals make up less than a tenth of the Bank's index but a third of the Economist index, for example. The latter is weighted according to the value of imports into all OECD countries: it is not UK-specific. Like the Bank index, the HSBC index places a relatively small weight on metals (12.7%). In general, it is the closest of the other major indices to the Bank's; it is the only other one in Table B to have UK-specific weights, but these are estimated

Products of the European Community) is a new business inquiry on the value and volume of production for all manufacturing activity; is published in 'UK markets' by Taylor Nelson and the Central Statistical Office. It does not at present provide suitable data on all commodities the compilation of the index.

VAT is excluded because changes in it do not reflect movements in demand or supply fundamentals.

The use of *net* imports where there is no domestic production may be explained, at least in part, by re-exporting of the commodities involved. There may be some semi or fully processed exports (and imports) included here, but efforts have been made to keep these to a minimum. The implications of this processed exports (and imports) included here, but efforts have been made to keep these to a minimum. of this exclusion are discu ed further

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Rapeseed is produced in significant quantities in the United Kingdom, and so is included in indigenous agriculture. Bananas are the only important non-indigenous fresh produce for which it has been possible to obtain a reasonably representative price series.

The agricultural price index does not take into account imports, for exports) of basic agricultural commodities which may be produced domestically. This is a significant omission in the case of fresh fruit and vegetables, where a large amount of UK demand is met by imports.

Table B Weights in various commodity price indices

	Metals	Fuels	Non-food agriculture	Foodstuffs
Non-oil Bank Economist IMF CRB (a)	7.1 33.3 20.2 21.7	38.8	6.9 19.3 22.9 30.4	47.2 47.4 56.9 43.5
Oil-inclusive Bank HSBC (a) (b) UN (a)	5.6 12.7 2.2	51.6 25.8 23.6	5.5 14.5 24.9	37.2 36.1 49.0

- These indices include commodities that do not fall within any of the four categories. The weights presented in this table therefore do not sum to a hundred. The HSBC index includes coal (with a weight of 12.4%) along with gasoline, gas oil and fuel oil (with a combined weight of 13.4%). It does not, however, include natural gas. (b)

from the producer input price index, rather than by whole-economy demand. So it does not take account of price movements in those commodities—particularly some agricultural goods—which feed directly into consumption.

The Bank index gives a much greater weight to fuels: even in the non-oil version, fuels—coal and natural gas—make up almost 40% of the index. By contrast, as Table B shows, non-food agricultural products (timber and cork, tobacco, natural rubber and cotton) are given much less weight in the Bank index than in the weights of the other indices. The International Monetary Fund (IMF) and United Nations (UN) indices (both of which are weighted according to export values in developed countries) give this commodity group a weight of between a fifth and a quarter.(1) The Commodities Research Bureau (CRB) index, which is US-based, weights each of its 23 chosen commodities equally and places a similar overall weight (30.4%) on non-food agricultural commodities. The Bank index, on the other hand, accords them a weight of less than 7%.

Overall, the indices apply more similar weights to foodstuffs than to the other commodity groups. Within the total figure, however, the Bank's index accords a much higher weight to indigenously produced agricultural commodities relative to non-indigenous foodstuffs than some of the other indices. The Economist index, for example, gives a weight of around 30% to foodstuffs not generally produced in the United Kingdom, compared with under 20% to indigenous agriculture; the weights in the Bank index are 2.8% and 44.4% respectively.

Part of the differences between the Bank index and the other indices can, however, be explained by the fact that the Bank index includes certain non-food agricultural products in its 'indigenous agriculture' component (which are included, along with non-indigenous foods, in foodstuffs in Table B). Wool clip is one example, though its weight is very small (less than 0.5% of the indigenous agriculture commodity group). And whereas some of the other indices include animal hides in non-food agriculture, these are part of the value of the livestock in MAFF's agricultural price index.

Comparison of these indices suggests that there is little 'convention' in their construction: approaches vary according to the nature and geographical coverage of the price pressures that analysts wish to measure. So for those interested in movements in the prices of basic commodities in the United Kingdom, the Bank's new index provides a useful alternative to previous approaches.

#### Other price pressures

Since the Bank index, by its nature, excludes (so far as possible) semi-finished and finished goods, it may not pick up other sources of price pressure. For example, the HSBC index includes chemicals; it is the only one in Table B to do so. Chemicals are not conventional 'basic' (ie unprocessed) commodities and since many are oil-based, including them in the Bank index could lead to double-counting. But if a country imports large quantities of chemicals, rather than producing them domestically using oil as an input, then excluding them will underrepresent the importance of oil price movements to the economy.

Similarly, the United Kingdom imports many semi-finished or finished goods containing the unprocessed commodities (such as timber, natural rubber and cotton) listed in Table A. These semi-finished and finished goods are specifically excluded from the index because it is not possible to separate the commodity demand from labour costs and other components of value added which may vary over time. But this implies that the basic commodities used as inputs to them are excluded, and the importance of their price pressures is underestimated. The point is particularly relevant for countries like the United Kingdom, where semi-finished and finished goods form an increasing proportion of imports: the percentage of UK visible imports accounted for by basic commodities has fallen from around 45% in 1970 to under 20% in 1994.(2) In such cases, the information about domestic price pressures provided by any index of basic commodity prices will become progressively less useful.

Other factors may have played a part in this process. Technological developments have both lowered production costs and encouraged the more widespread use of synthetic substitutes for some commodity groups. The growth of the service sector may also have helped to reduce commodities' importance to the whole economy. And other factors, such as wage costs and the margins on semi-finished products, may become more important further along the supply chain.

#### **Recent trends in the Bank index**

#### Movements in the overall index

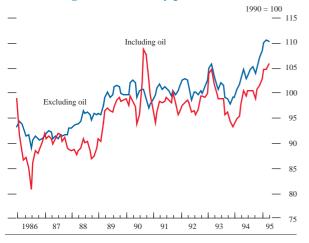
Chart 1 presents the movements in the non-oil and oil-inclusive versions of the Bank index from 1986 to the present. It shows that the non-oil index has been much less

This comparison is based on the UN's index for developed countries and the IMF's index for industrialised countries (rather than their headline

indices), as they provide a more relevant comparison for the United Kingdom.

(2) Basic commodities are defined for this purpose as food, beverages and tobacco, basic materials and fuels, in accordance with the CSO's definitions in its Monthly Review of External Trade Statistics.

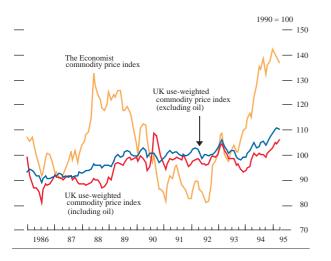
Chart 1 UK use-weighted commodity prices



volatile over the period, because it was less affected by the strong movements in oil prices in the late 1980s.<sup>(1)</sup> Since the end of 1990, however, the two versions have tended to track each other more closely.

Chart 2 contrasts the Bank's indices with the Economist sterling index, which excludes oil and is probably the most widely quoted of the major indices discussed in the previous section. The Bank non-oil index is much less volatile than the Economist index. In particular, although it did rise noticeably from mid-1986 to mid-1989, it did not mirror the strong increase in the Economist index during this period.

**Chart 2 Bank and Economist commodity price indices** 



And whereas the Economist index fell significantly between 1990 and mid-1992, the Bank index did not display any particular trend. The Economist index also rose far more emphatically from mid-1992, as the world economy came out of recession. Both the oil-inclusive and non-oil versions of the Bank index rose quite strongly during 1994, but less than the Economist index. The latter has faltered in the early part of 1995, while the Bank index has remained strong.

#### Behaviour of the commodity groups

Tables C and D provide explanations of the relatively low volatility of the Bank index, showing the contributions of the different commodities to the annual (December to December) movements in the Bank and Economist indices. Table C details movements in the oil-inclusive Bank index, and Table D compares the non-oil version with the Economist index, including the movements from December 1994 to April 1995.

Table C shows that most of the changes in the Bank index arose from movements in the prices of metals, indigenous agricultural produce and fuels. Price changes in non-food agricultural commodities and foods not grown domestically had a minor impact—each contributing less than one percentage point to the Bank index in any year. This point is worth stressing given the publicity that price movements in some of these commodities attract: for example the increase in coffee prices following the news of frosts in Brazil in 1994.

Table C
Contributions to movements in the (oil-inclusive) Bank index, 1989–94

Per	cent

	1989	1990	1991	1992	1993	1994
Aluminium Copper Lead Nickel Tin Zinc <b>Metals</b>	-0.6 -0.4 0.1 -0.1  	-0.5 -0.3 -0.2 	-0.5 -0.2 -0.1 	0.7 0.4 — — — — 1.1	-0.1 -0.4    -0.5	1.5 1.2 0.2 0.1 — 0.1 3.1
Coal Natural gas Crude oil <b>Fuels</b>	-0.2 0.5 7.8 <b>8.1</b>	1.6 2.6 <b>4.2</b>	0.5 0.9 -5.8 <b>-4.4</b>	-0.6 2.8 <b>2.2</b>	-1.9 -0.1 -4.6 <b>-6.6</b>	-0.7 
Cotton Rubber Timber Tobacco Non-food agriculture	0.1 0.6 0.1 <b>0.8</b>	0.3 -0.1 <b>0.2</b>	-0.1 -0.1	0.1 0.1 0.2	0.6 -	0.1 0.8 —
Cocoa Coffee Edible oils Rice Tea Bananas Non-indigenous	-0.1 -0.2  0.1 	-0.1 -0.1 -0.1	0.1 -0.1 — —	0.1 — 0.1 —	0.2 0.1 0.1 0.1 0.1	0.4 0.1 -0.1 -0.2
foods Indigenous agriculture	-0.2 4.2	-0.3 -1.6	1.5	0.2	0.5	2.9
Index	10.8	1.0	-4.0	3.8	-6.0	8.7

Note: The contributions are calculated from an approximate decomposition of the price index; they therefore contain a residual error.

It is evident from Table C that metal prices have tended to be volatile and highly correlated with one another; in any one year different metals' contributions have typically been in the same direction. Metal prices declined in 1989 and the following two years, reflecting the substantial expansion in exports to western markets from the former Soviet Union and new information about the weakness of demand as activity levels fell in the industrialised economies. In each of these years, movements in metal prices lowered the

<sup>(1)</sup> There may be links between oil prices and the prices of gas and coal, so that the non-oil index would itself be affected by oil price movements.

Bank's oil-inclusive index by around one percentage point. After 1991, there was no clear trend in metal prices until October 1993, when they began to pick up. Their sharp growth in 1994 accounted for 19.6 percentage points of the 25.3% rise in the Economist index, and 3.9 percentage points of the 7.9% rise in the Bank's non-oil index.

In contrast to metal prices, the prices of non-indigenous foods have not tended to move in the same direction. This may reflect lower sensitivity to the level of industrial activity and a greater role for supply shocks—particularly from weather conditions—to individual commodities. Oversupply in both cocoa and coffee markets kept their prices relatively subdued until 1992. The impact on the Bank's index was small, however, with price changes generally making an impact of no more than 0.2 percentage points. Even the Brazilian coffee price rise in 1994 added only around half a percentage point to the Bank's index. The larger impact that these price movements had on the Economist index reflected the fact that its combined weight for cocoa and coffee is around 15%, compared with 1% in the Bank index.

Table C shows that, in terms of their impact on the Bank index, movements in crude oil prices have dominated all the other commodity groups in every year except 1994. Crude oil prices rose in 1989 and 1990; the Iraqi invasion of Kuwait in August 1990 provoked a rapid increase in the price of crude oil—with Brent crude rising from around \$18 a barrel in July to nearly \$35 a barrel in October, before falling back to just over \$18 a barrel in February of the following year. This explains the spike in the Bank's oil-inclusive index (see Chart 1). In the non-oil index, fuel price rises contributed to the overall rise in the index in 1991, outweighing the fall in metal prices. In 1993, a sharp fall in the price of coal, as electricity companies negotiated new, lower-price contracts with British Coal, dominated other price changes.

Table D shows that between 1989 and 1991 indigenous agriculture was the prime contributor to movements in the Bank's non-oil index, and that in 1994 it was the second

Table D
Comparing contributions in the (non-oil) Bank and
Economist indices

Per cent

	1989	<u>1990</u>	<u>1991</u>	1992	<u>1993</u>	<u>1994</u>	<u>1995</u>
Bank:							
Metals	-1.3	-1.5	-1.0	1.4	-0.7	3.9	-0.5
Fuels	0.5	2.0	1.8	-1.1	-2.7	-1.1	0.4
Non-food							
agriculture	1.0	0.2	-0.1	0.2	0.7	1.1	_
Non-indigenous food	-0.2	-0.3	_	0.3	0.6	0.8	-0.2
Indigenous agriculture	5.3	-2.1	1.9	0.5	_	3.7	3.6
Index	4.3	-1.9	2.7	0.8	-2.0	7.9	3.1
Economist:							
Metals	-6.7	-7.2	-4.2	5.7	-4.1	19.6	-1.6
Non-food							
agriculture	2.8	-4.5	-0.5	5.1	6.6	2.2	1.4
Foodstuffs	-2.9	-9.5	0.9	7.0	9.5	8.0	-0.6
Index	-8.5	-21.3	-4.7	18.2	12.6	25.3	-0.5

Note: The contributions are calculated from an approximate decomposition of the price index; they therefore contain a residual error.

most important factor. Generally, the prices of domestically produced agricultural commodities are, like those of non-indigenous foods, less sensitive to the level of overall demand in the economy than metal prices. This is not only because they are subject to other shocks, such as the weather, but also because they are affected by changes to the Common Agricultural Policy. In addition, they are influenced by the effect of exchange rate changes on CAP prices; the devaluation of the 'green pound' by more than 20% since 1992 has raised CAP prices in the United Kingdom by more than 27%.<sup>(1)</sup>

The Bank index did not fall at the beginning of the UK recession in 1989, for example, because the drop in metal prices was outweighed by a very strong increase in agricultural prices. Prices fell somewhat in 1990, however, before recovering again. More recently, the devaluations in the green pound during 1994 and early 1995, reflecting the decline in sterling's value, have contributed to the upward movement in the index shown in Chart 1. Table D shows that the non-oil Bank index increased by 3.1% between December 1994 and April 1995, while the Economist index fell by 0.5%; the Economist index does not pick up the increases in sterling-denominated CAP prices resulting from the green pound devaluations (although it does reflect rises in the prices of imported foodstuffs as a result of sterling's devaluation). These increases may have an impact on the costs of food manufacturing industries, and also on the prices of imported fresh produce purchased directly by consumers.

In the fuels sector, the impact of further deregulation in the gas industry—where commercial and domestic markets are due to be fully open to competition by April 1998—may have significant effects on the aggregate level of commodity prices. Again, these effects will not be picked up by many of the other major indices.

#### Comparisons with producer and retail prices

Charts 3, 4 and 5 compare the behaviour of the Bank and Economist indices with price movements further along the supply chain—in Chart 3 with producer input prices, in Chart 4 with producer output prices and in Chart 5 with retail prices.

It is clear from Chart 3 that the Bank index is much more closely correlated with producer input prices than the Economist index. The correlation of the two commodity price indices with the other price indices appears to decline further along the supply chain, although the Bank's index continues to be the more closely correlated because of its lower volatility. This decline occurs because the value added at each stage of additional processing, together with the costs of distribution and sale to the final consumers, increasingly outweigh the prices of the original raw materials. For example, over 40% of the purchases of raw materials and fuels by *manufacturers* that appear in the producer input price index are of commodities in the Bank's

<sup>(1)</sup> For a fuller explanation and discussion of the impact of green rates of exchange, see the box on page 46 of the May 1995 Inflation Report.

Chart 3
Commodity prices and producer input prices



index (with the rest of the producer input price index being made up of purchases of, for example, electricity and synthetics). In the *retail* prices index this figure is reduced by around half, with foods accounting for approximately 14% and fuels (for domestic heating and motoring) a further 6% or so.

The charts provide little evidence that the Bank's index is a leading indicator; its relationship with input prices, for example, appears to be roughly coincident. This is not surprising: the prices of some of the most important commodities in the Bank index—indigenous foods and natural gas—are determined in large part by policy changes,

Chart 4
Commodity prices and producer output prices

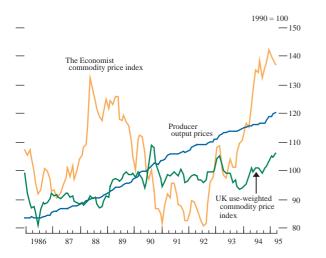
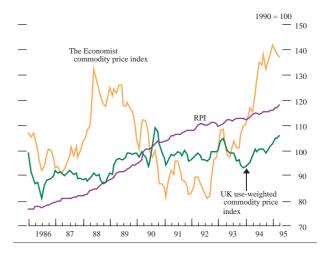


Chart 5
Commodity prices and the RPI



rather than being set in auction markets where new information on demand and supply conditions can be taken into account instantly in price formation, enabling commodity prices to adjust rapidly.

#### Conclusion

Care is needed in interpreting movements in commodity price indices, since their coverage differs widely. In particular, some of the major indices are not designed to reflect UK commodity use, and accordingly neither cover fuels comprehensively nor use appropriate agricultural prices.

The new Bank index has been constructed to address these issues. As a result, it has strong links to UK producer input prices. Even this new index, however, is not particularly informative about price movements which take place further along the supply chain and at the retail level, because the importance of commodity prices diminishes as other costs (such as wages and margins) become more important. Technical and other developments may also be reducing the influence of commodity prices over time.

Nevertheless, the price behaviour of unprocessed commodities does provide an extra piece of information, which may be of value in understanding and interpreting inflationary pressures in the United Kingdom. To be of greatest use, an index must be representative of the actual movements of commodity prices in the United Kingdom and of their relative importance. The Bank's new commodity index is constructed for this purpose.